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JULY 1992

# FOOD ENGINEERING

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READ IT & WIN
AD CONTEST
SEE PAGE 75

# FOOD ENGINEERING

ABOUT THE COVER

Over the years, "turnkey" has come to mean more than simply a passing of the keys from contractor to food processor. Now, relationships between the two often extend well beyond completion of the project.

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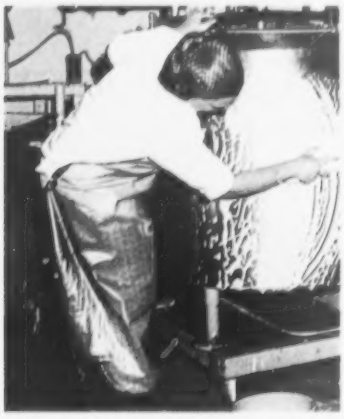

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JESSE H. NEAL AWARD-WINNING EDITORS

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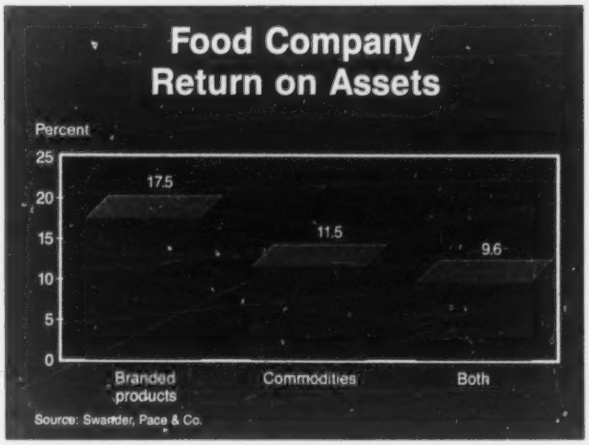
## Balancing brands and private label kills profitability

*Companies that simultaneously manage brands alongside existing commodity or private label operations are losing profits, according to a study completed by Swander, Pace & Co., San Francisco. The consulting firm analyzed the financial performance of 64 food companies (with annual sales between $85 million and $24 billion) from 1986-1991. The study compared companies that either primarily sold branded goods or commodities with those that, through product development or acquisition, tried to sell both.*




***Companies selling branded products show the highest return on assets.***

*Return on assets for branded products was 17.5 percent and for commodities, 11.5 percent. However, companies combining branded and commodity products realized a mere 9.6 percent return. Swander, Pace & Co. attributed the fallacy of combining brands with commodities to the fundamental differences that exist between each category's gross margins, marketing spending, sales force requirements and retail support.*

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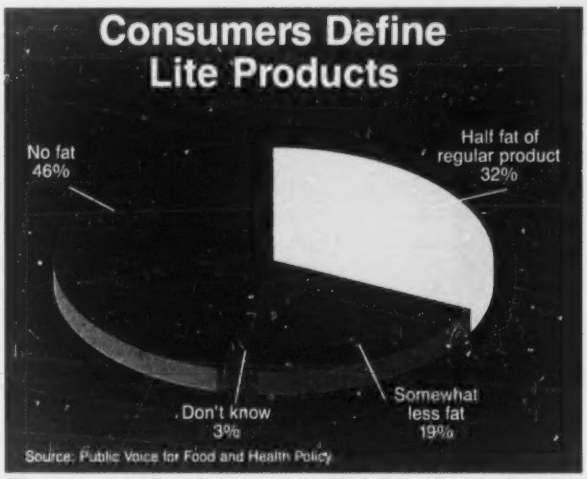
# INDUSTRY REPORT

## Blinded by lite: findings of consumer survey

*Nearly half the consumers responding to a poll sponsored by Public Voice for Food and Health Policy said the term "lite" should be used in reference to a low-fat or nonfat product, rather than as a generic term to indicate calories, cholesterol, salt, color or texture. The survey was conducted by the Survey Research Center at the University of Michigan (January 1992).*

*Public Voice said the Food and Drug Administration's (FDA) proposal—that "lite" foods feature a 50 percent reduction in fat, and the food industry's position— that "lite" should show a 33 percent reduction, both ignore what consumers want. Some 46 percent of those polled expect "lite" products to have almost no fat at all. Low-income and elderly consumers are more apt to think "lite" refers to having no fat at all, the survey concluded. The FDA stated within its proposal that the definition of "lite" should be based on the consumers' perception that it means reduced in calories.*


Consumers Define Lite Products
No fat 46%
Half fat of regular product 32%
Somewhat less fat 19%
Don't know 3%
Source: Public Voice for Food and Health Policy

***The vast majority of consumers think lite refers to low-fat.***

SlipStick®, the won't-bre
shake-the-coatings-
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# AMEXICANADA

# ITS IMPACT ON FOOD

The prospect of 360 million consumers in a borderless market spurs "rationalization," investment and exports.

**CHARLES E. MORRIS**
MIDWEST EDITOR

American business isn't waiting for ratification of the proposed North American Free Trade Agreement (NAFTA) linking the U.S., Canada, and Mexico into a common market of 360 million consumers.

According to a new study entitled *A North American Common Market?*, published in April by Cleveland Consulting Associates (Cleveland, OH), no less than 87 percent of the 190 U.S. executives (representing 170 companies) responding say their companies are already doing business in Mexico. Eighty-four percent expect ratification of a Free Trade Agreement (FTA) with Mexico; and 76 percent believe the U.S. should pursue free-trade negotiations with other Central and South American nations.

The CCA study also demolishes the perception that U.S. manufacturers see Mexico mainly as a source of cheap labor, and free trade as an opportunity to cut the cost of goods sold in the U.S. Eighty-five percent of the respondents cite access to a new market of 81 million consumers as the greatest benefit of free trade with Mexico, while only 13 percent list operating efficiencies as their top priority.

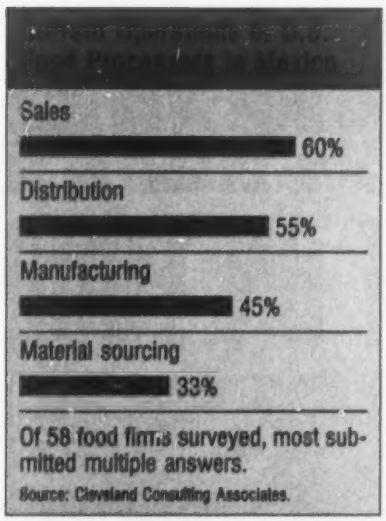
Most respondents recognize, however, that major benefits depend on "rationalizing" their North American operations—that is, consolidating or expanding manufacturing and distribution where necessary to eliminate duplication and optimize efficiency.

**Grupo Trasgo, which accounts for 14 percent of Mexico's poultry production, is currently expanding operations with a $100-million U.S. investment. (Source: Mexican Investment Board.)**

## Food outlook

Of the 170 companies covered in the CCA survey, 58 are food-processing firms; 38 of these are *Fortune 500* members. Fifty-one operate in Canada; 49 currently do business in Mexico.

Since implementation of the U.S./Canada FTA, eight have increased ownership of Canadian subsidiaries, seven have entered new licensing agreements, five have executed mergers or acquisitions, and seven have entered new joint ventures. To



further boost efficiency in serving combined U.S./Canadian markets, 28 see opportunities to rationalize manufacturing plants, 41 to expand or rationalize distribution systems, and 15 for sourcing raw materials or components.

If an FTA with Mexico is approved by Congress, 31 would consider establishing new distribution systems in Mexico, 37 would set-up new sales functions, 22 would startup manufacturing plants, and 18 would source raw materials and components. Nine say they would eliminate or reduce similar activities in the U.S. or Canada, 38 say they would not.

If the proposed NAFTA is implemented to create a North American Common Market, 31 see opportunities to rationalize manufacturing, 44 would expand or rationalize distribution, 26 see new sources for raw materials or components.

Major stimulus for the burgeoning interest of American manufacturers in a NAFTA embracing Mexico: The unprecedented economic reforms instituted since the 1986 admission of Mexico to GATT (the General Agreement on Tariffs & Trade) and the 1988 election of President Carlos Salinas de Gortari. To pave the way for a free-trade agreement with the U.S., Mexico has reduced its maximum tariff rate, substituted tariffs for non-tariff barriers on many products, dropped import licensing requirements on several agricultural and processed-food products, liberalized investment policies to allow up to 49-percent foreign ownership of agricultural land and 100-percent foreign ownership in other economic sectors, and restructured its foreign debt.

According to the Mexican Investment Board (MIB), a joint government/private-banking venture which promotes foreign investment in Mexico, these reforms have to date reduced state ownership from 1,600 to 200 companies, slashed the annual inflation rate from 160 percent in 1987 to 19 percent in 1991, and boosted direct foreign investment in Mexico from $2.5 billion in 1989 to $4.8 billion in 1991 for a cumulative total of about $35.8 billion.

Recent predictions in the horizontal business press that a North American Free Trade Agreement will be reached this summer, however, are "highly speculative," cautions Harry Schmick of the Foreign Agricultural Service at USDA. NAFTA negotiations, conducted from the American side by U.S. Trade Representative Carla Hill's office, involve 19 different negotiating groups, each covering a different sector such as tariffs, automotive, agriculture, standards (e.g., health and sanitation), transportation, telecommunications, investment and financial services.

"Some of these groups are close to agreement, but others have a way to go," Schmick observes. Example: The U.S. and Mexico want a comprehensive agreement phasing-out all agricultural tariff and non-tariff barriers, but Canada wants to protect certain industries such as dairy and poultry (not covered under the U.S./Canada FTA).

### 'Plant-specific' strategies

Consensus of sources contacted by *Food Engineering*: The U.S./Canada Free Trade Agreement, which took effect Jan. 1, 1989, may be accelerating rationalization of food companies on both sides of the border to some degree, but this trend was well underway in both nations during the "mergermania" of the late 1980s. "There was a lot of consolidation going on both before and after the FTA, so consolidation isn't due to the FTA alone," observes Dr. Charles R. Handy, section leader in the Economic Research Service at USDA.

"Long-term restructuring was going on anyway, so it's hard to separate the two," agrees Odette Vaughan, who tracks Canadian food mergers and acquisitions at the Policy Branch of Agriculture Canada, Ottawa. "And there are other factors involved as well, including GATT and multinational corporate strategies relating to EC '92."

Example: Campbell Soup Compa-

ny's 1991 $160-million repurchase of the 29-percent publicly-held shares in its Canadian subsidiary Campbell Soup Co. Ltd., and the integration of Campbell Canada with Campbell USA to form Campbell North America. Because the FTA changed Canadian regulations to allow 100-percent U.S. ownership of Canadian firms, this move seemed to be sparked by the FTA but "it would have happened anyway," says Campbell spokesman James H. Moran.

The move actually anticipates a North American common market: Campbell followed-up last January by combining Campbell North America with its Mexican and Argentine operations into Campbell North & South America "to take stronger advantage of an emerging three-country North America trading bloc," wrote President & CEO David W. Johnson in the company's second quarter '92 financial report.

Vaughan sees corporate rationalization strategies in the wake of the Canada/U.S. Trade Agreement (or CUSTA, as FTA is known in Canada) as "plant-specific" rather than corporate or country-specific.

"Typically, before CUSTA, U.S. food companies opened Canadian plants to avoid tariffs," Vaughan points out. "But now that tariffs are being phased out, other factors come into play, such as labor costs and distribution."

Because the Canadian population is concentrated in a long, narrow East-West strip along the U.S. border, food companies will consolidate plants on both sides: In some cases a Canadian plant will be better situated to serve certain U.S. markets, in other cases a U.S. plant will be better positioned to ship to Canadian markets. "The province of Ontario will be a clear winner because of its location," adds James H. Gilmore of CCA.

In general, however, Gilmore sees manufacturing of value-added food products shifting more to the U.S. and production of lesser value-added products to Canada. Example: Proctor & Gamble's shift of *Duncan Hines* cake-mix production for Canada to its plant at Jackson, TN.

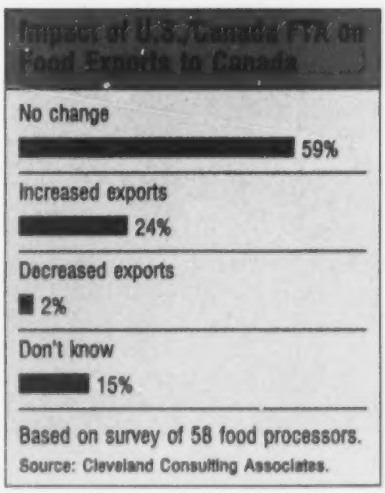
## Mexican cookies aim at U.S. markets

**Backed by parent Pepsico, Mexico's Empresas Gamesa set up G&S Foods Corp. (Los Angeles) in May to launch "a two-pronged expansion program" aimed at both the Hispanic and mainstream economy-cookie markets. In the U.S. G&S is marketing the upgraded *Gamesa* line of cookies and crackers for the Hispanic-foods section of the supermarket, plus the new *G&S* line for the regular cookie shelf. Vertical integration, whereby Gasmesa controls the entire process from raw-material production to delivery of the packaged product "gives us an unusual ability to offer both total quality control and cost advantages," explains G&S National Sales Manager Chuck Curtis.**

### Rationalization gathers steam

Whether spurred by the FTA or not, U.S. and Canadian firms continue to rationalize operations in varying ways on both sides of the border. Recent examples reported by food-research officers Roseanne Hill and Monica Treidlinger at Agriculture Canada, and culled from corporate reports by *Food Engineering*:

- Gerber shut-down its baby-food plant at Niagara Falls, ON and shifted production for the Canadian market to its plant at Fremont, MI.
- Kellogg set up a new division called Kellogg North America embracing Kellogg Canada and Kellogg USA, which nevertheless remain separate entities. The new division continues to invest in all six of its cereal plants including the Canadian operation at London, ON, says Kellogg.
- Borden closed its 100 year-old plant at Ingersoll, ON, shifting con-



densed milk production to a new plant at Montreal and non-dairy products to U.S. plants, and shut-down pasta plants at Toronto and Winnipeg, shifting 75-percent of Winnipeg production to Lethbridge, Alberta and the rest to U.S. plants.

- Nabisco shut down a plant at Simcoe, ON but invested $2 million in its plant at Exeter, ON.
- International Multifoods is building a new bakery-mix plant at Toronto "to take advantage of the expanded markets that free trade is expected to bring."
- Cargill commenced a $4-million expansion of its beef-processing plant at High River, Alberta, to capture new export opportunities to the U.S. and Japan.
- William Neilson invested $3 million in new equipment to produce chocolate bars for U.S. markets.
- CSP and Central Soya of Canada merged, then purchased the vegetable-oil division of Canada Packers to create CanAmerica Foods, Canada's largest oilseed processor with 3 percent of the U.S. market.
- Culinar, Inc. (Montreal) acquired Drake Bakeries (Wayne, NJ) for access to the Northeastern U.S.
- The bakery-products division of H.J. Heinz, based at Leamington, ON with 12 plants in the U.S. and Canada, acquired four frozen baked goods firms—two in Canada and two in the U.S. Heinz itself purchased J.L. Foods, the frozen foods division of John LaBatt based in Eugene OR (and including Olmstead Foods of Wheatley, ON) and shut down a StarKist tuna cannery in New Brunswick.

[redacted] Foreign Food/Beverage Industry Outlays at Issue

| | 1987 | 1991[1] |
|---|---|---|
| Canada | 1,829 | 2,471 |
| Mexico | 210 | 1,490 |
| Japan | 371 | 394 |
| Europe | 7,414 | 8,912 |
| Rest of world | 2,858 | 4,262 |
| All countries | 12,682 | 17,529 |

[1]Estimated.
Source: U.S. Dept. of Commerce.

According to Treidlinger, CUSTA has opened niche-market opportunities in the U.S. for some smaller Canadian processors. Example: Pasta Plus plans to open the first of 25 U.S. fast-food franchises in Boston later this year, supplying franchisees from its plant at St. John's, Newfoundland.

CUSTA has also spurred U.S. investment in the Canadian food industry, Vaughan reports. From 1982-89, U.S. direct investment in the Canadian food industry increased by an average of 5 percent per year. After declining by 13 percent in 1988 (probably due to uncertainty about the pending CUSTA), U.S. investment in the Canadian food industry surged by 6.6 percent in 1989 and another 13.6 percent in 1990. This could portend a greater flow of products from Canada to the U.S., Vaughan observes. "CUSTA is not having a negative impact on the Canadian food industry," she concludes.

Since value-added foods carried higher tariffs than raw materials, the tariff phase-out called for by the FTA has already boosted U.S. exports of processed foods to Canada. According to Economist William V. Janis at the U.S. Dept. of Commerce, U.S. processed-food exports to Canada soared from $1.41 billion in 1989 to $2.63 billion in 1990 to $3.01 billion in 1991. Processed fruits and vegetables led the way, zooming from $191 million in '89 to $408 million in '90 and $485 million last year. Reasons, says Janis: 1.) higher costs of production due to

shorter growing seasons in Canada; 2.) more fragmented markets, with some more easily reached from the U.S.; 3.) greater government intervention to prop agricultural prices in Canada, causing higher raw-material costs for processors.

### Investment in Mexico booms

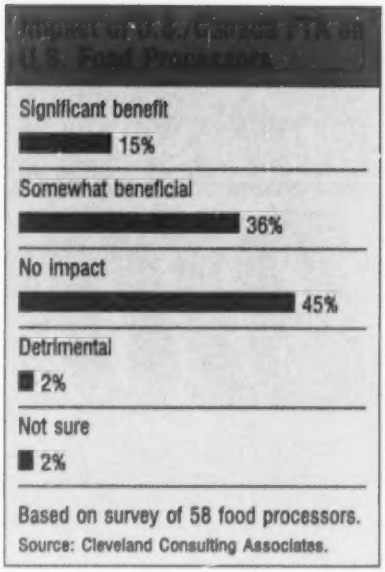
According to the CCA study, the major deterrents to trade with Mexico are its inadequate transportation infrastructure, its's foreign capital rules, and currency instability. As noted earlier, the latter two are being addressed by Mexican economic reforms and are improving. To upgrade transportation facilities, the Salinas administration has privatized road construction and is pumping more than $1 billion per year into overhauling the state-owned rail system, with technical support from U.S. rail carriers. Negotiations are expected to ease Mexican transport regulations, which currently require transferring shipments from American to Mexican carriers at the border.

U.S. food processors operating in Mexico and surveyed by CCA rate the productivity, quality, labor stability, delivery reliability, manufacturing costs and management capabilities of their Mexican operations as "good." Only one category surveyed—engineering capabilities—is considered "marginal."

The improving economic climate coupled with bright prospects for NAFTA is dramatically stimulating U.S. investment in the Mexican food industry. According to the Dept. of Commerce, U.S. direct investment in the Mexican food industry soared more than 700 percent from $210 million in 1987 to an estimated $1.49 billion last year. According to USDA's Chuck Handy, U.S. processed food and feed exports to Mexico nearly doubled from $887 million in 1988 to $1.5 billion in 1991, but direct investment by U.S. processors in their Mexican affiliates helped boost affiliate sales to $4.1 billion—nearly three times higher than exports!

Recent examples of U.S. investment and rationalization in Mexico, as reported by USDA, the MIB or the companies themselves:

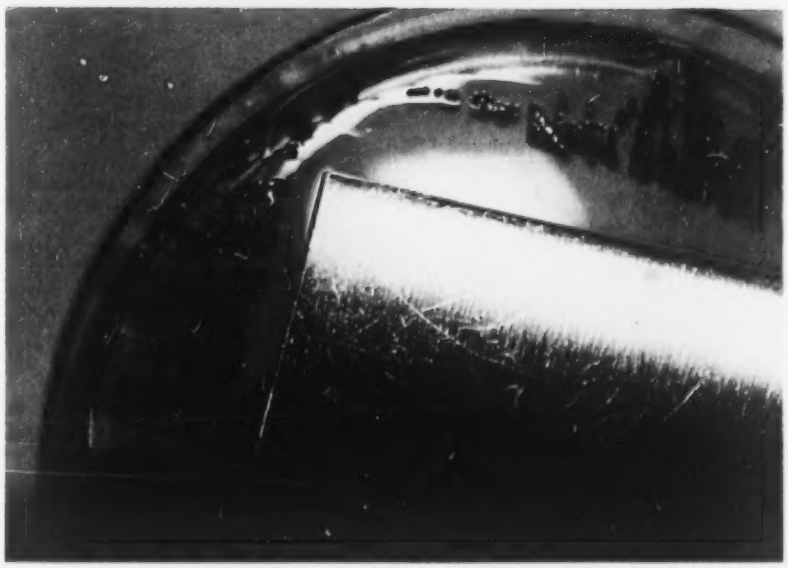
- Pepsico in Oct. '90 acquired 54-percent interest in cookie baker Gamesa (see sidebar), with whom it had earlier formed a joint venture to raise wheat and beans as raw materials in association with communal farmers and small landowners.
- Pepsico and snack-foods partner Sabritas invested $44 million last year in two new plants, with further expansion planned this year.
- Campbell's canned-foods plant in Paris, TX ships some products into Northern Mexico, while its canned/frozen-vegetables plant at Villagran, Mexico ships some products into Southern California.
- Tyson entered into a joint venture with poultry processor Grupo Trasgo and C. Itoh & Co. whereby Tyson provides technology and technical assistance to a $60-million Trasgo investment in chicken production by communal farmers. Itoh markets about 50 percent of the processed chickens in Japan.
- Sara Lee entered a joint venture with Grupo Industrial Bimbo, Mexico's largest baker and one of the few Mexican firms with a national distribution network, whereby Bimbo will distribute Sara Lee bakery and processed-meat products in Mexico while Sara Lee distributes Bimbo bakery products in the U.S.
- Tropicana has two projects totaling $14 million, one privately-owned and one in partnership with farmers, to produce and market oranges. Procigo, a Mexican firm, will process oranges into juice, which Tropicana will market in Mexico and foreign markets.
- Green Giant (Grand Metropolitan) started-up a $16-million wholly-owned, vertically-integrated vegetable processing and packaging facility in the state of Guanajuato.
- Ralston-Purina, which has operated feed plants in Mexico for 35 years, recently started-up a new feed plant at Monterrey and a pet-food plant near Mexico City. ▲



SPECIAL EMPHASIS: **SANITATION**

# SANITATION:

# HOW TO COMMIT BIOCIDE



**If a sanitation program is effective, there will be no growth surrounding the sanitized area. (Source: Diversey's International Biocide Lab.)**

In the strictest sense, sanitation means getting bacteria where they live. But that requires a greater awareness of plant conditions, training practices and QA plans.

**LETICIA MANCINI**
TECHNICAL EDITOR

"Sanitation tools aren't new," said Bob Richardson, manager of inspection services for General Mills to an audience of sanitarians at last October's DFISA show, "You know what to do with foam cleaners and the like. However, we as an industry haven't figured out how to put it all together."

Richardson was describing problems with executing sanitation at food plants. Every plant has some type of program; every plant thinks they're doing it right. But still there are quality and contamination problems. The thousands of recalls of diverse food products for *Listeria, Salmonella* and *Staph* contamination every year are proof of that.

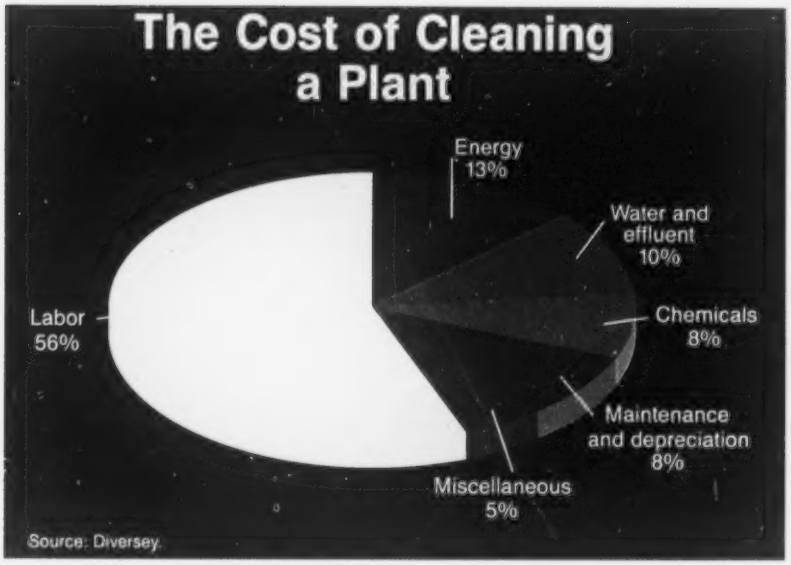
The technology to combat bacterial contamination is there (and is always improving), but without a greater understanding of microorganisms, it is ineffective. However, food companies are not without hope. Problems can be solved fairly simply by taking a good hard look around the plant.

### Listeria hysteria

Now for the bad news: many types of bacteria can attach firmly to all types of food processing surfaces, including rubber, stainless steel and Teflon. Without proper attention, gooey biofilms can form, spelling disaster in the form of contaminated product.

According to Diversey Wyandotte Corporation's International Biocide Laboratory (Wyandotte, MI), 5 to 10 percent of foodborne poisoning outbreaks are caused by improperly cleaned food processing equipment. One organism that strikes fear in the heart of many is *Listeria monocytogenes*, because it is so pervasive. Listeria poisoning, or listeriosis, is almost always severe, and sometimes fatal.

This organism has the ability to withstand heat, acidic conditions and high salt concentrations. But its most frightening aspect is that it can thrive at temperatures as low as 0°C and can survive temperatures as high as 82°C, which indicates it can withstand some




**Since labor is over half the cost of a sanitation program, it is imperative that workers be properly trained.**

cooking processes.

Still, proper cleaning cannot be emphasized enough in the control of Listeria. If biofilms are destroyed completely with cleaners, there will be no contamination. However, if surfaces are *not* completely cleaned, sanitizing them won't help. Researchers at Campbell Soup have documented that Listeria is resistant to a number of sanitizing chemicals on a variety of surfaces. In the case of Listeria, the old saying "You can't sanitize a dirty surface" has never been more true.

"Listeria has taught us that some previously sound principles are not so," commented Dr. Don Zink, Quality Assurance and Product Safety manager at Nestle USA, to the same DFISA audience. Zink explained that Listeria is present in all plants, thriving in drains, warehouses and standing water. More attention must be placed on environmental control, he said, especially on preventing cross contamination.

### Spotting trouble

"Be innovative and persistent when looking for sources of contamination," said Zink. For instance, segregating raw ingredients and processing areas, and limiting human and forklift traffic between them, can improve matters. Free movement of employees can be monitored by using different colored uniforms. And keep forklifts clean and separate. "What good are sanitizing dips for workboots when they will be placed on dirty forklifts?" he said.

The FDA also calls for the segregation of brushes for food contact and non-contact surfaces. Here, Sparta Brush's (Sparta, WI) new *Tri-Zone* color coded brushes can help. In the Tri-Zone program, red brushes are used for raw food areas, white for processing areas, and yellow for general custodial use. A fourth brush, black, is used for floor drains, a favorite hiding place for Listeria.

Even routine maintenance cannot be ignored. All rubber gaskets should be replaced once a month, before cracks appear that harbor bacteria.

But a little detective work can be a sanitarian's most important weapon in the battle against Listeria, says L. B. Guzzo, technical manager at Oakite Products (Berkeley Heights, NJ). He relates this anecdote: "I worked with a dairy that had a continuing Listeria problem. They were constantly pouring chlorine down the drain. Their swab tests continued to come up negative, but product would still be contaminated. Finally, we discovered that the problem was due to a mechanic using a filthy grease gun to fix all the clean machines, and touching everything." That practice came to an immediate stop.

According to Guzzo, chlorinated foamers are most effective against Listeria. Oakite markets *FiChlor Foam HD*, a high-foaming heavy duty chlorinated foam for cleaning stainless steel surfaces, and *FiSan ACF* for aluminum surfaces.

Mal Sorgenfri, vp of R&D at Alex Fergusson (Frazer, PA) suggests using quat-based sanitizers to follow. The company markets a unique product, the *Power Block*, to be placed in drains after cleaning. It is quat-based, but it is a solid, so that when water flows over it, a small portion dissolves to keep Listeria under control.

And there is a new type of sanitizer from Klenzade (St. Paul, MN) made

from peroxyacetic acid. *Oxonia Active* was developed for CIP sanitizing and provides killing activity in water temperatures as low as 40°F. The product is also biodegradable under normal waste treatment.

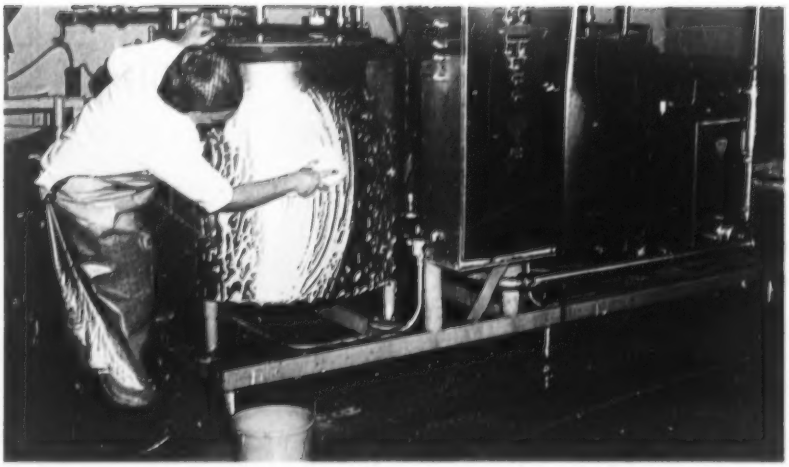
### Improving training

But using the right product doesn't do much good if it is used incorrectly. Half of all sanitation costs are labor, but sanitation workers are probably a food plant's most neglected resource. They are extremely important when it comes to controlling contamination.

"Somebody has to supervise how cleaning procedures are taught," commented Dick Bakka, director of technical services at Klenzade. "All too often you have Joe Blow teaching some other guy how to clean equipment. The new guy picks up all of Joe's bad habits." Bakka advocates getting cleaning procedures written down, including what chemicals to use and in what concentrations, and keeping them in a bound notebook in a central location. Supervisors should retrain workers, if needed, and supervise the training of new workers.

Klenzade has recognized the importance of properly trained workers in the development of their *QUASAR* program. The program, an acronym for Quality, Assurance, Answers and Results, details what chemicals a plant might need, and how to use them. Special care is taken so the worker is not overexposed to chemicals. An important part of the QUASAR program is *Quorum*, a full line of chemicals that utilizes colors rather than names on its labels. The product labels are also bilingual, which makes training easier and less variable.

Sometimes the sanitation supervisor is in need of training. Here, Dennis Bogart of Diversey Wyandotte takes a hard line: "Most sanitarians are not educated well enough in food and spoilage microbiology. There is a tremendous amount of myth about how to get rid of bacteria." Diversey publishes a manual, *TACT WINS*, that can be used to train supervisors about the fundamentals of cleaning.



**Ward off potential contamination. Make sure employees don't use the same brushes on food contact and non-contact surfaces. (Source: Diversey Wyandotte.)**

The manual outlines the principles of time, action, chemical concentration, temperature, water, individual employees, nature of soil and surface to be cleaned (tact wins) and their cumulative effects on bacteria.

Getting crews to understand the principles of microbiology is a different matter. Experts advise sending sanitation workers into the plant, armed with petri dishes, to conduct swabbing tests. "When they do the testing and incubating themselves, sanitation workers gain a greater appreciation of organisms and what they can do," noted Nestle's Don Zink. One food safety manager likes to take a blacklight into the plant to show crews the flourescing bacteria they missed during cleaning. All surveyed said that training was the weakest part of sanitation programs, but when employees are approached with respect, they show a greater commitment to learning.

### Good QA sampling

The third important part of sanitation is developing an adequate microbiological sampling and testing plan. Are you doing the right tests? Are they still critical? If QA reports negative results or low counts, but quality problems continue, the current testing programs must be overhauled.

Rather than step up testing of product, increase environmental testing in the plant. This way, the absence or

# Does your plant pass the white glove test?

What's right with this picture? The plant shown, American Packaging's Bag Division headquarters in Story City, IA, has received a superior rating in the "White Glove" inspection for cleanliness and sanitary conditions given by the American Institute of Baking.

This voluntary inspection is extremely critical, and is based on five criteria: adequacy of sanitation program, pest control, operational methods and personnel practices, maintenance for sanitation, and cleaning practices. A plant needs to score at least 900 out of a possible 1000 points to receive the superior rating. American Packaging scored an exemplary 915 points. The company did especially well in the cleaning practices category.

Does your plant or your supplier's plant pass muster? According to AIB's consolidated standards for packaging facilities, cleaning tasks should be divided into three general areas. First, there is the daily, or cosmetic cleaning, that should be done every day as part of each individual employee's work assignment. Secondly, deep cleaning should be listed frequently on a master schedule. This cleaning is essential in eliminating dust and other soils that contaminate the containers. The third type of cleaning includes electrical systems and other difficult-to-clean equipment.

Don't forget to include lavatories, offices, water fountains and trash containers in daily cleaning. In addition, floor drains should be cleaned at least on a weekly basis, and employee lockers should be cleaned at least monthly. White lines (for determination of pest problems) should be scrubbed frequently to keep them free of dust and stains, as well as pest evidence.

The AIB also requires that formal records are to be kept for all cleaning and maintenance practices, as well as developing written cleaning procedures for all production equipment, including the use of cleaning chemicals. Facilities scoring above satisfactory levels are awarded a Certificate of Achievement by the AIB.

presence of pathogens can be determined as well as the location of microbial growth pockets. For instance, floor drains, which are always wet, should be sampled and tested. If pathogens are found, tests of the entire "watershed" are warranted. Also, metal-to-metal surfaces, cracks and crevices, undersides of mats and insulation on pipes should be monitored to confirm that they are not growth pockets. Do not overlook standing water, peeling paint, compressed air lines, wooden-handled tools or equipment repaired with tape.

When sampling, it is important to use good aseptic technique. There are several different methods of sponge sampling, depending on whether the surface to be sampled is wet or dry. If you are unsure of how to sample correctly, independent testing labs can explain the correct technique.

Prior to testing, equipment should be dismantled to expose nooks which may harbor bacteria. As an indication of how effective a cleaning and sanitizing program is, samples from equipment can be collected after cleaning, and compared to samples taken before cleaning.

Silliker Labs in Chicago Heights, IL recommends testing environmental samples first for aerobic plate count or coliforms. Not only are the tests useful for ferreting out microbial growth, they reveal sites that could support pathogenic organisms. These tests can be done at relatively little cost, compared to pathogen testing.

If it sounds like environmental testing can be as complex as a military battleplan, it is. But when sources of contamination are found, then systematically eliminated, proper cleaning by properly trained workers is all that is needed to keep bacteria under control. ▲